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ABSTRACT

This interdisciplinary environmental education guide, developed by teachers, focuses on the creative teacher, presenting him/her an approach for involving all types of students in junior and senior high schools in activities which would cause them to evaluate values and give them an opportunity to express their own thoughts. The guide includes six topics: problem solving, solid waste, energy, population, awareness, and the Farkleberry Question. Problem solving includes land use, politics, and prescriptive thinking. Solid waste examines family garbage, methods of solid waste disposal and includes the garbage game, and supportive materials; role playing, data collection, and observation are used. Energy considers such topics as energy conservation, gasoline consumption, economic costs, and utility management. Population focuses on crowding space, limited resources, population growth, and solutions; a population game is included. Awareness aims to help the student become emotionally involved with his environment; included are field trips, creative writing activities, and discussion topics. The Farkleberry Question is a simulation game which involves an environmental hearing on a project and its environmental impact. (TK)

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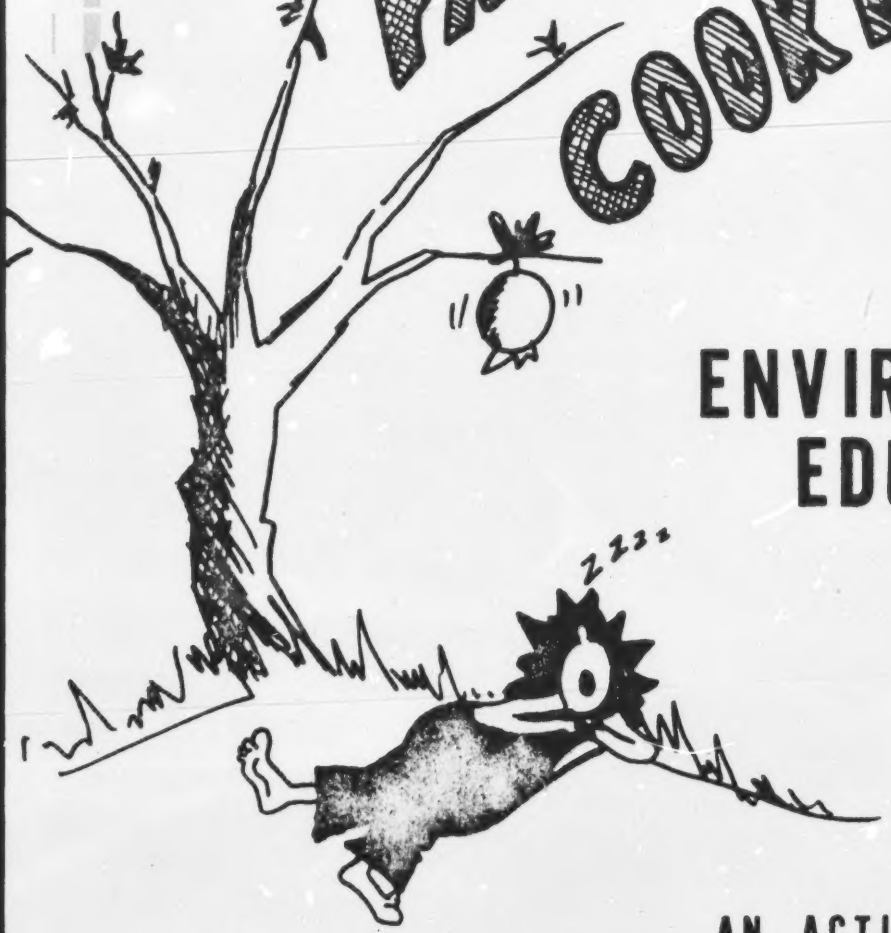
THE FARKLEBERRY COOKBOOK



IN ENVIRONMENTAL EDUCATION

AN ACTIVITY GUIDE
for
CREATIVE TEACHERS

SE 015 627

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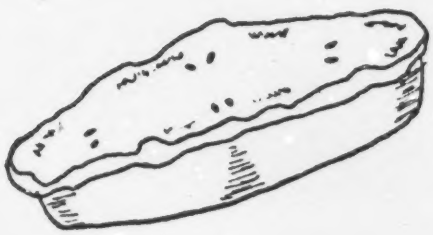
Environmental Education Office
Arkansas Department of Education

ECO INVOLVEMENT PIE



TAKE: 1 Worn-out World
1 Active and alert Teacher
1 Or more interested Administrators
1-? Bored Students
Assorted Activities from the Farkleberry Cookbook

Mix well with a good portion of Love and Care. Bake under a warm sun for several hours.

Results: Involved Students
Serves: Arkansas and the World

WHAT DO YOUR STUDENTS SAY ABOUT YOUR TEACHING?
ARE THEY BORED WITH FACTS AND UNINVOLVED WITH CLASS-WORK?

These activities are written by current teachers. Most were used last year with exceptional results in increasing the awareness of, and interest in, the world around us.

Here is what our students have to say about their past year.

ANN BOWN

"In conclusion, I just want to say that what I got out of this course is (maybe where you can't see it) Maturity".

MARYLYN WHEELESS

"I like a class that doesn't try to pound things into your head instead of your learning it by enjoying yourself".

REBA GAINES

To sum everything up, I've discovered that there are two sides to every problem and each has to be carefully analyzed, that there are no simple "pat" answers to a problem because everything is related to everything else, and most important, I've found myself asking "why?" to situations and not accepting a standard statement (I can think for myself!)"

JULIE ANDERSON

"I also like the fact that in this course you didn't have to memorize a bunch of facts that you'll never use again just to make good on a test. You had to think - not memorize, and the things we learned we can use - we'll need to use them to live in the world. Contrary to what seems reasonable, I've become a little less "gung-ho" to environment. Now, I'm more inclined to be practical, look at both sides of the situation and try for a compromise."

RICKY YATES

"I respect the human being and nature more than ever after taking this course".

P R E F A C E

THE FARKLEBERRY COOKBOOK is an unusual name for a book. The authors of this book intended to give creative teachers something different that would challenge their imagination. Our philosophy was simply this -- to involve all types of students in junior and senior high schools in activities which would cause them to evaluate their values and give them an opportunity to express their own thoughts.

This book is not a curriculum guide. It is an activities guide that involves students in dealing with real or simulated situations in which they must choose between alternatives or reach compromises.

Each of the writers chose an environmental topic and was given assistance under the Environmental Education Act of 1970 through the Environmental Education office of the U. S. Office of Education. They were able to purchase commercial and non-commercial environmental education materials that were in existence or create their own material in order to field test these in their classrooms during the 1973-74 school year. This explains why there is some change in the writing style among the number of topics in the book. All of the materials that were used are listed with their complete address.

The book as a whole can be used as a guide or each of the topics taken separately in any order. The authors did not intend to cover each topic in its entirety. They tried instead to give teachers tested activities upon which they could build.

All the authors helped to write "The Farkleberry Question" which is a humorous but true to life simulation game. This and the book's illustrations gave birth to its title. Special thanks is given to Will Parker for his illustrations. The activities in this book were written for use anywhere in our country, although some special flavor was added.

Arkansas is an unusually lucky state in many ways. Ya'll come to visit.

William L. Fulton, Specialist
Environmental Education
Arkansas Department of Education
Little Rock, Arkansas 72201

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Edited by: William L. Fulton
Specialist, Environmental Education, Arkansas Department of Education.

Grateful acknowledgement is made to the following for permission to reprint or use ideas from their material.

"Deciding How To Live On Spaceship Earth", Rodney Allen & others, Plover Books, Winona, Minnesota 35987
"Introduction to Environmental Science", Phillip Foster, Learning Systems Company, Homewood, Illinois 60430
"Energy Crisis: A Teacher's Resource Guide", N. J. State Council on Environmental Education, Montclair State College, Upper Montclair, New Jersey 07043
"Project Clean", Shawnee Mission Public Schools, 7235 Antioch, Shawnee Mission, Kansas 66203
"Population 2000", Denver Chapter ZPG, c/o Zero Population Growth, Inc. 1346 Connecticut Avenue, NW, Washington, D.C. 20036
"Population, Environmental & Society", Lawrence M. Schaefer, 625 Orange Street, #38, New Haven, Connecticut 06511
"Energy & Man's Environment - Activity Guide", Thomas F. Ris, 2121 Fifth Avenue, Seattle, Washington 98121

Special thanks to the Environmental Education office for their patience and to Mrs. Sara Wade for her typing and re-typing of this Guide.

PROBLEM SOLVING APPROACH IN ENVIRONMENTAL EDUCATION

Myra Aldridge

Introduction

The following unit is planned with several objectives in mind; to develop and encourage environmental sensitivity as well as developing a lost skill, that of evaluating problems and prescribing solutions to these problems. This author is more concerned with developing thought processes than with disseminating a library of statistics which are out-of-date by the time they reach print.

Our objectives as educators has been and is to prepare our students for the world in which they will live. So, to prepare our students to live on "Spaceship Earth", we must encourage the problem-solving approach in environmental education as well as in other areas of the curriculum. The ability to analyze a situation, look at all angles and then prescribe a course of action is one which is sadly lacking in too many of our fellow passengers on our "Spaceship". In this age of specialization, one tends to let the proper authorities handle the problems of the world. In other words, we "pass the buck".

If attitudes are going to change, as they must for our survival, we must begin somewhere, and what better place than that great untapped American resource, brainpower. It is important to remember that teenagers of today have lived under the threat of the "bomb" and now a new bomb threatens them - the "population bomb". To encourage a positive approach to life, the problem-solving approach will involve the student in decision making and perhaps he will feel there is hope for a future

after all. Three sets of exercises follow, covering a broad area of problems. These were used, along with others, in an environmental science course offered at Ozark High School (1973-1974). The students had completed one year of biology previously. However, these activities could be used in any subject area at any level of education with a little modification.

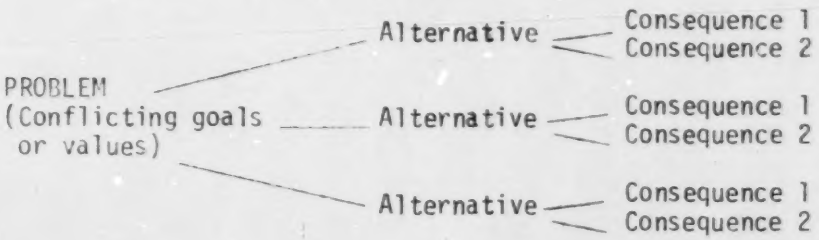
We used as texts for the course, Deciding How To Live On Spaceship Earth, by Allen et al, published by Plover Books, Winona, Minnesota, 1973, and Introduction To Environmental Science, by Foster, Learning Systems Company, Homewood, Illinois, 1972. The approach we followed in developing the units follows the Allen text approach very closely. We modified the situations to suit the topic of discussion and to fit our geographic area, Arkansas.

To understand fully the prescriptive type of judgment developed through these activities, see page 5-8 of Deciding How To Live On Spaceship Earth.

For more detail on this alternative-consequences approach, refer to Chapter 21 of Introduction to Environmental Science, page 149.

Prescriptive Thinking

I. Select a local problem and have students develop alternatives and possible consequences using a method similar to the following:



In class discussions following the rules of brainstorming, list all possible alternatives. Have your students research the alternatives and develop their consequences for class debate.

For example:

PROBLEM	ALTERNATIVES	CONSEQUENCES PRO	CON
Solid Waste Disposal in Franklin County Arkansas	1. Build incinerator	1. Dispose of flammable waste 2. Cheaper to run except dump alternative	1. Air pollution 2. Metal waste problem 3. Ash disposal
	2. Keep existing dump	1. Do not have to change 2. Cheapest to run 3. Provides same jobs	1. Air pollution 2. Water pollution 3. Breeds disease
	3. Sanitary Landfill	1. No air pollution 2. No disease produced 3. Land can be redeveloped	1. Equipment cost 2. Cost of salaries 3. Methane gas production 4. Could pollute ground water
	4. Used to generate heat or electric energy	1. Etc. 2.	1. Etc. 2.
	5. Continue with other alternatives		

For more on solid waste refer to unit in this guide.

LAND USE

Introduction

Land use is one of the critical problems facing Arkansas. The decisions made now should preserve the natural beauty of our state and at the same time develop our economy to its fullest potential. Use the following situations to develop sensitivity to this critical area. The unit on Land Use in the Introduction to Environmental Science is a useful introduction to this unit.

R E C I P E S

Economics
Social Studies
Language Arts
Science

Situation One

Concept: Community Planning

Hometown, Arkansas, is a town of 2,500 people. Set in a beautiful area of Northwest, Arkansas, it is in an economically depressed area. A major appliance company is looking for a site for a plant within the region. If the company builds in Hometown, it promises to employ up to 3,000 within a six year period. The company will build in Hometown if land is donated for its use. Should Hometown acquire the desired land and give it to the appliance company? What are the conflicts here? As a member of the city council, what would your decision be? Weigh consequences and make your judgment.

Situation Two

Economics
Social Studies
Language Arts
Science

Concept: Economic Trade-offs

Mr. John Smith owns a farm of 243 acres which he has worked for 50 years, improving the rough wooded land into good pasture land for livestock. Recently, a representative of a coal strip-mining operation has been taking samples in the area. The representative found coal located 45 feet below the surface on Mr. Smith's property. The coal company has offered Mr. Smith $500 more per acre for his 243 acres than the going price on developed farm land. If the coal operation follows the example of past companies (due to a low bond on refilling) the land will be stripped and not refilled with the company forfeiting its bond (which is much cheaper than refilling). What are the value conflicts here? If you were in Mr. Smith's position, what would be your decision and why?

Economics
Social Studies
Language Arts
Science

Situation Three

Concept: Private Right vs. Public Good

Mr. Sam Kilroy has lived in a small valley on the Black River for many years. Each year, low-lying areas fill with water quickly during periods of heavy rain. Now, Mr. Kilroy plans to fill in the areas, reasoning that the water would go elsewhere, making more of his land productive.

However, the proposed area is the flood plain for the valley. If filled in, homes in the lower part of the valley will be threatened by spring flooding. The value of these residents' property will drop and most of the topsoil will wash away. In spite of these facts, Mr. Kilroy feels that since it is his land, it is his right to do what he wants! What are the conflicts here? Does Mr.Kilroy have a case? Why? Why not? Do the residents of the lower valley have a case? Why? Why not?

Idea from "Deciding How To Live On Spaceship Earth".

Economics Language Arts
Soc. Stu. Science
Drama

A D D I T I O N A L R E C I P E S

1. The Redwood Controversy - A land resource simulation game. Excellent in that it shows both sides of a touchy environmental question. (Can be purchased from Houghton-Mifflin). This is a role-playing simulation of a Senate committee hearing in Congress concerning the redwood trees. Realism is developed by the 21 participants (witnesses and Senators) having profile cards which give them background information on the role they are to play. Everyone becomes involved, extrovert as well as introvert, and the academically as well as the unacademically inclined.

Economics
Social Studies
Language Arts
Science
Drama

2. Activity on Land Use - Land-Use simulation game - U. S. Forest Service "Environmental Education Workshop for Resource People". This gives background information on a city planning board hearing. Some land has been given to the city and the board must decide how to use it. The class, working in groups, develop proposals which they try to persuade the board to adopt.

3. The Farkleberry Question - located elsewhere in this book. A simulation involving Arkansas places and people. It develops attitudes in land-planning and shows both sides of an emotional issue.

REFERENCES

1. Deciding How To Live On Spaceship Earth, Allen - Plover Books

2. Introduction to Environmental Science, Foster - Learning Systems Co.

POLITICS

Introduction

Especially in the days of "Watergate" we are quick to say the government should do this or that. However, as in other areas, political problems usually do not have black or white solutions. Usually the answer lies somewhere in between. The first item for discussion should be the role of a politician. Should a politician vote his conscience or should he vote the will of the people? After some discussion the following situations should develop attitudes on the importance of politics to the environment.

R E C I P E S

Economics
Social Studies
Language Arts
Science
Drama

Situation One

Concept: Role of the Politician

Mr. John Q. Lawyer is a Congressman from the 3rd District of Western Arkansas. He is a convinced conservationist, deeply concerned about protecting the natural beauties of his home state. Last week, a bill was introduced in Congress which would enable the Corps of Engineers to begin a flood control project on the Farkleberry River. A great deal of pressure is being put on Mr. Lawyer to vote for the bill by constituents from his district.

Should John vote the way his conscience suggests or should he vote as his constituents want him to? He is up for re-election next year.

Economics
Social Studies
Language Arts
Science
Drama

Situation Two

Concept: The Economics of Urban Planning

A plan has been submitted to the City Planning Commission of Big Rock, Arkansas, to develop the existing inner city housing area into an environment of which residents could be proud. The Commission has previously voted to build several high-rise buildings capable of housing 100 families.

Black leaders contend that the existing horizontal ghetto will be transformed into a vertical one. They would like the city to purchase more land and build several smaller units, each with its own playground, parks and other recreation areas. They contend that such a project would promote community pride, thereby reducing the crime rate and cutting down on juvenile delinquency.

The Commission's present plans call for more money than is available, but the new plans would require additional millions of dollars. The only way to build the new type of community would be to raise property taxes. As an elected City Commissioner, which plan would you support and why? What are the basic conflicts here?

ADDITIONAL RECIPES

1. Use the political attitudes survey on pp. 40-41 of Deciding How To Live On Spaceship Earth. This is a survey which shows the awareness and attitudes of the person taking the survey on political-environmental issues. What makes this especially interesting is to compare persons of different groups, males vs. females, or differing educational backgrounds.

2. Attend a city council meeting to get the feel of local politics.

3. Involve the class in some local environmental issue, if only by just investigating how the problem is being handled by authorities in question. Example: Find out background on why the Corps of Engineers recommended "no project" on the Strawberry and Mulberry Rivers.

4. If you wish to contact a government official or congressman, a good way to insure his reading the letter is to send a registered letter.

5. If you have not used the Redwood Controversy previously, this would be a good time. Students come to see that the role of an elected official is not an easy one.

6. The Farkleberry Question - a simulation involving Arkansas places and people. Shows that environmental problems are also political questions. (See page 51)

SOLID WASTE

William Fulton

According to the Department of Health, Education and Welfare, of all the solid waste collected, 77% of it ends of in 14,000 rat-and-fly infested open dumps across the United States.

Only 13% of this solid waste is disposed of in sanitary landfills where waste are covered each day with a compacted layer of soil. Approximately one acre of land per year is needed per 1,000 people for each foot level of waste deposited. The dirt used to cover the landfill must have specific levels of water content for easy compaction. To compact the dirt, certain heavy machinery is needed.

About 10% of the solid waste is incinerated and then buried. Incineration has the advantage of rapid disposal and elimination of some health hazards, but its initial cost is high and a great deal of energy must be used in this process. There is also the possibility of air pollution from improper operation.

Nearly 25% of our nation's solid waste is never collected.

All of the above methods waste some of our most valuable resources. The only long range solution is recycling of our solid waste. Recycling has been viewed as expensive, particularly in our state, although we have several groups who have undertaken recycling projects and have operated them at a profit.

Presently in Arkansas there are somewhere in the neighborhood of 200 to 250 dumps in operation. There are 40 various types of landfill operations and about 7 incineration operations. The League of Women Voters received a grant from the Environmental Protection Agency for solid waste management training. They have collected information on the status of resource recovery in Arkansas. Information can be obtained from the League regarding recycling programs in Arkansas.

Math
Social Studies
Science

II. RECIPES

A. Family Garbage. How much do you produce? Select representative sample from student volunteers for the following activity. Volunteers need home bathroom scales, and a willingness to sort their family's garbage for one week. Have them complete the following chart:

Weight for each	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Food							
Paper							
Metal							
Glass							
Plastic							
Others							
Total Weight							

Family Name _____

Number in Family _____

Average Per/Person = $\frac{\text{Total Weight}}{\text{Number in Family}}$

Calculate the average amount of solid waste generated per person in each family and then compare families. The average amount of solid waste per person in the United States is between 5 and 6 pounds. How does the class compare to this figure?

Social Studies
Science
Math

B. Community's Method of Solid Waste Disposal. Have students either by personal interview or by phone obtain the following information from someone in the community that is knowledgeable (Mayor, member of Town Council, Sanitation Department or private waste disposal company).

1. Location of and type of disposal site. Have student draw location on a base map of community.

2. What type of pick-up system exists? How many make use of it? Compare this figure to the number of people in the community to see if coverage is adequate.

3. How is this service paid for? How many trucks and personnel are involved?

Social Studies
Science

C. Methods of Solid Waste Disposal. Refer to background information for general review of the different methods. Have students research the various methods in books or by interview or contacting various groups that are listed.

1. Articles on Waste Disposal or Environmental Pollution can be found in the World Book.

2. The easy to read "Arkansas Solid Waste Disposal Code" is available free from the Arkansas Department of Pollution Control and Ecology. "Let's Dump the Dump!" is an Environmental Protection Agency pamphlet that discusses Solid Waste Management in easy to understand terms. Both books are free. See reading List.

3. For information concerning Landfills and their possible site locations, contact your local Soil Conservation Service Agent.

Drama
English
Social Studies
Economics
Science

D. THE GARBAGE GAME, A ROLE PLAYING ACTIVITY.

Background Information: The small make-believe town of Glenview, Arkansas, has been ordered by the Department of Pollution Control and Ecology to close the town's open dump. The Town Council must now decide on what method of solid waste disposal they will turn to. Various groups in the community have made suggestions such as a sanitary landfill and recycling. Two locations have been suggested for a sanitary landfill - one is located next to an upper class neighborhood called Oakdale. This location appears to be ideal due to the geology of the area. It is also very expensive to purchase. The other location was suggested by Colonel Bob, the town's land developer. This location

is near the town's river and the cost to the city would be very low. The water table in this location is very high and not well suited for a landfill. Flooding occurs yearly.

Game Rules: The class is divided into 4 faction groups, plus one member who will be Colonel Bob. Each of these groups will develop proposals along the following lines:

Group	Role
(1) Oakdale Homeowners	They are rich home owners who don't want an unsightly dump next to them.
(2) Local Ecology Group	This group would like for the city to recycle its waste.
(3) Members of the Chamber of Commerce	These are very cautious people who do not want the community to spend its money unwisely. They emphasize caution.
(4) Glenview Citizens' Committee	These people favor a sanitary landfill in the Oakdale location.
(5) Colonel Bob	He will lease to the city the land located next to the river at $4.00 an acre per month. (Colonel Bob plans to develop an amusement park in this area, once the landfill has been completed. The Colonel owns 5 acres of land).

Give each of the groups, including Colonel Bob, at least a day in which to develop their proposals. You may wish to give the groups an additional day for research. Each group must prepare a visual display and more than one person from the group must make a presentation to the Town Council (except Colonel Bob). Each group will make a 3 minute presentation. Select a timekeeper who will tell the groups when 2 minutes are up and at the end of 3 minutes stop the presentation.

As each of the groups' plans begin to take form and interest grows, suddenly announce to the class that the City Council has resigned and that each of the 4 groups (Oakdale, Ecology, Chamber, Citizens) has one minute to select one of its members to sit on a new Town Council. This new Council will then listen to the 5 proposals on the following day. They are instructed to elect a chairman from their 4 members and they are not to discuss any of the proposals to anyone.

On the following day, the new Council meets and decides in what order they want to hear the proposals; they hold a Town Council meeting,

after which they vote on the various proposals and announce their decision to the class.

Discussion - The class can then discuss why they decided on whatever proposal they did, or perhaps why they couldn't reach a decision. The class could discuss the feelings of the various faction groups, such as how it felt to be an Oakdale homeowner or how the ecology group felt toward the homeowner group. Ask the class what additional information they would like to have had in order to make the game more realistic or to help them in their decision making. Where could they have obtained this information?

The idea for the game rules was taken from the U. S. Forest Service Workshop, "Environmental Education for Resource People - Land Simulation Game".

III. SUPPORTIVE MATERIAL

One of the best and to the point books on land/resource-use and waste disposal is entitled Land and Trash, Our Wounded Land, by Anthony Sherman. This little book discusses the western man's viewpoint toward the use of nature and why we are where we are today. It serves as an excellent introduction into resource use and disuse.

The "Introduction to Environmental Science" by Phillip Porter discusses the solid waste problem and its data, but more important is the discussion in chapter 21 on alternatives-consequences approach.

SUGGESTED READING LIST

1. Arkansas Solid Waste Disposal Code, by the Arkansas Department of Pollution Control and Ecology, 8001 National Drive, Little Rock, Arkansas 72209 - Free.

2. Let's Dump the Dump, by U. S. Environmental Protection Agency, Washington, D. C. 20460 - Free.

3. Land and Trash: Our Wounded Land, by Anthony Sherman, Pendulum Press, Inc., West Haven, Conn. 06716 - .95¢.

4. Scenic Pollution, from Man and Environment Project, Post Office Box 278, Dardanelle, Arkansas 72834 - Free.

5. A Curriculum Activities Guide to Solid Waste and Environmental Studies, by Project Kare, Institute for Environmental Education, 8911 Euclid Ave., Cleveland, Ohio 55106 - $6.75.

6. Introduction to Environmental Science, by Phillips W. Foster, Learning Systems Company, Homewood, Illinois 60430 - $3.50.

7. Recycle, The League of Women Voters of the U. S., 1730 "M" Street, N.W., Washington, D. C. 20036, Publication 132 - .75¢.

ENERGY

Tana Beasley

Introduction

Energy has become an important term in our vocabulary. We Americans use more of it than any of the other people on the earth. Although the United States only has six percent of the world's population, we consume almost one-third of the world's energy supply. It appears our demand for energy will drastically increase in the future, even with our attempt at energy conservation, unless we greatly change our life style.

The use of energy and the economic affluence of the country is strongly tied together. It appears that the more energy we have to use, the more the country needs. The United States enjoys its affluence because of our reliance on technology and greater use of energy. We use energy whenever we produce our clothes, drive to work, light and heat our homes and offices and produce our food.

We are beginning to bump up against the limits of our energy consumption and we are having to pay the price. As we have seen in the past, energy was an inexpensive commodity for Americans, but the situation has drastically changed.

We are currently having a limited amount of energy made available to us due to shortages of energy sources and energy refineries. Not only do we have shortages, but the energy that we are using now causes much environmental degradation. Fifty percent of the air pollution can be related to the use of energy. Not only do we need to conserve energy, but we must limit the pollution that it can cause.

The burning of fossil fuels gives us about ninety-six percent of the energy that we use (coal 20%, natural gas 33%, and petroleum 43%). The remaining four percent of our energy we obtain from hydro-electric power and nuclear power.

RESOURCE RECIPE

One of the better reports for student use in understanding the energy problem is a special report published as a newspaper by the Seattle Post-Intelligencer during the "1974 energy crisis". It could also be used to review and to reflect upon in the future. The report is entitled, "A P-I Special Report: ENERGY AWARENESS", Monday, February 18, 1974, and is available from:

Newspaper in the Classroom Program
P-I Education Department
Seattle Post-Intelligencer
Seattle, Washington, 98101

RECIPES

Social Studies
Science

Concept: Ways to Reduce Heating or Cooling Losses

Accumulate lists of ways to retain heat or cooling in the home, school or a business. Have a contest for the best slogan, poster or bulletin board idea on cooling or heating conservation. You may even want to compete with other rooms. Use the students' ideas in the classroom or some other place in the school.

Ask your principal or superintendent to proclaim an "All-out Energy Week" and try the following:

1. Display energy poster, slogans, etc. made by the students.

2. Ask your local newspaper to feature an article about the "Energy Week". Give them a list of things that parents, business people, etc., can do to help conserve energy.

3. If you have several good posters, ask your local merchants to display these posters in cooperation with the "Energy Week".

4. Have an all-out effort on the students' parts to conserve energy that week and perhaps get into the habit of doing this all of the time.

The following are sources you may want to use:

1. The ABC's of Converting to Electric Heat - Arkansas Power & Light

2. Citizen Action Guide to Energy Conservation - Citizen's Advisory Committee on Environmental Quality, 1700 Pennsylvania Avenue, NW, Washington, D. C. 20006

3. How to Use Electrical Heat for All Its Worth - A P & L (Electric Energy Association)

4. The Energy Management Handbook - A P & L

5. Watts Going on Where You Live? - A P & L (General Electric_

6. You Can Bring That Electric Bill Down! - Woman's Day, February, 1973

7. Consumer Tips on Using Electric Energy - Louisiana Power & Light Company.

Driver Education
Shop

Concept: Tune-Up For Better Driving

Calculate data to see how many miles per gallon of gas different cars get at speeds of 50, *60, *70 mph.

In shop classes, tune motors up, then try mileage test again.

Application:

1. What kinds of cars got the best results?

2. What did the hp or weight of the car have to do with the results?

3. Was there any difference in the results after the cars were tuned up?

4. Would the pounds of air carried in the tires affect the results?

Possible sources of help or information

1. Automobile shops or factories

2. Highway Patrol

3. "More Miles From A Gallon Of Gas" - Better Homes & Gardens, September, 1973

4. "The closer You Look" - Fuel Economy Bood, Ford Motor Company

5. "Fuel Economy - Consumer Information" - Ford Motor Company

*Cooperation of local police department or highway patrol should be obtained.

Concept: Long-Range Temperature Comparison

Social Studies
Science

The object of this exercise will be to compare temperature range and energy usage with other parts of the state. It is suggested that you contact other schools in areas different from yours and ask them to participate and exchange information with you.

You will need to use a structure in which you can monitor the electrical or fuel consumption (for example, your home or school). This exercise needs to be carried on over a period of several weeks or months so that a comparison can be made.

Procedure: Record the following information:

1	2	3	4	5	6	7
Date	Time	Temp.	Temp Inside	Weather	KW Used	Other Fuel or Power Consumed.
				Cloudy, etc.		Cubic Feet etc.

Numbers 6 and 7 may be taken from the fuel company readings.

Additional Factors:

1. Have the students find out what kind of areas they are comparing. Mountains, plains, etc., climates.

2. Have the students find out about the type of insulation used in the monitored structures. Sould this have any bearing on the energy consumed? (See AP&L booklet, THE ABC's OF CONVERTING TO ELECTRICAL HEAT, pp. 10-11 on insulation, or contact a local building contractor).

3. What areas in your comparison study used the most energy for maintaining an inside constant temperature? (Remember, this could be for either heating or cooling).

4. What might the weather have to do with your results?

Social Studies
Distributive Ed.
Science

Concept: Compare Now and Then

Prepare a list of items made with or from petroleum (toys, cloth, lubricants, gas, heating oil, plastic products, etc.) This can be broadened to include products that need fuel to obtain or move raw materials, depending on the products in your area.

Compare the cost and availability between now and a month, 6 months, or a year ago. (Go back further if such records are available to you.)

Local industries and many stores have people who can help classes with a project such as this:

Application:

1. How does one shortage lead to the shortage of a seemingly unrelated item? How were the two items actually related? (The petroleum products can easily be tied in with many other products).

2. How does a shortage affect the economy of a town?

   Plastic -- toy industry

   Gas -- lumber and paper

   Gas -- automobile sales - factory

Source of Help

Consumer Protection Agency, Justice Building, Little Rock, 72201.

Social Studies
Science
Math

Concept: Solid Waste Possible Energy Source?

Content

The amount of refuse, including solid organic waste, produced in this country can no longer be effectively disposed of by landfill operations and other conventional methods. Currently, the quantity of solid waste being produced in the United States annually contains more than two billion tons or organic garbage. This volume of refuse has created a disposal problem for most urban municipalities, which are running out of landfill areas. Solid organic wastes can be converted into synthetic fuels, thus providing a partial solution to the waste disposal problem and a fuel shortage problem. Methods of conversion of solid organic wastes into synthetic fuels are: Pyrolysis, bioconversion and hydrogenation. Hydrogenation requires organic waste material, a catalyst, high

pressure and heat. Hydrogenation yields a synthetic oil at the rate of about two barrels per ton of dry waste. The oil has a lower sulphur content and a lower energy value than commonly used fuel oil. The technology necessary for the hydrogenation process currently exists.

Pyrolysis, or destructive distillation, can produce a variety of synthetic fuels, gases, oils and solids. The process involves heating shredded wastes to temperatures of about 500 degrees C in anaerobic environment. Bioconversion utilizes living organisms to digest, break down and convert organic wastes into other materials.

The fuel produced by this process is the gas Methane. One disadvantage of bioconversion is that it leaves an organic sludge that must be disposed of in some other manner. Up to half the total weight of organic waste is water, which has no fuel value. Widespread conversion of organic refuse into fuels could supply approximately 5% of our total annual oil consumption.

Activities:

Ask students to investigate what happens to their refuse after they put it in a garbage can. Who picks it up? How much does garbage collection cost? Where is the garbage ultimately disposed of, and in what way? Are there any attractive alternative forms of disposal, and if so, why are they not currently being used?

Have students calculate the amount of local garbage capable of being burned. Have them devise a plan by which their municipality could supply their town's electrical needs by burning garbage and using the resulting energy to generate electricity. Does their municipality produce enough garbage to fill this need? If not, where could their town get enough? Could such an operation be made profitable?

The amount of garbage produced on a per capita basis by Americans has been growing steadily. Have students examine their family garbage. What is it composed of? How does the garbage of an American household differ from that produced by the average family 100 years ago? How did people 100 years ago dispose of their garbage. Did they have a disposal problem of any kind?

"Energy Crisis: A Teacher's Resource Guide"
N. J. State Council on Environmental Education (Source)
Montclair State College
Upper Montclair, N. J. 07043

Concept: Responses to Energy Shortage

Content

The President has declared that he will initiate "Operation Independence" designed to achieve energy self-sufficiency by 1980. Figures from the Joint Atomic Energy Committee predict greater dependence on oil imports from 40 million barrels in 1973 to 56 million barrels in 1985, to 85 million barrels by the year 2000.

Electrical energy in the home is utilized in the following proportions:

Electricity in The Home--Share Of The 1960-70 Increase in Demand

Barry Commoner makes the point that proper insulation in buildings would require 40% less heating energy; if all homes met proper insulation standards, total energy use would decrease by almost 5%. He further states that a 23% savings in energy use can be brought about through sound conservation practices, but not without dramatic changes in the American life style.

The Office of Emergency Preparedness published a report in 1972 pointing to three areas where energy conservation could be maximized:

1) space heating--the installation of improved insulation in both new and old houses and the use of more efficient air conditioners;
2) transport--a shift of intercity freight from trucks to rail, of intercity passengers from air, to rail and bus, and of urban passengers from autos to Motorize mass transit, along with an improvement in urban freight handling systems through consolidation and containerization.

3) electricity conversion--the introduction of more efficient industrial processes and equipment, such as the combined-cycle generating plant.

Activities:

Try to think of several substitutes for the energy sources that we now use. For example, solar energy, windmills, tides, etc. Design a house or a building or a transportation device using your invention.

Draw a diagram or build a model of your new invention. Discuss the advantages and disadvantages of your invention.

Keep track for one week of all the places you go that require a car. Divide the list into four (4) categories:

a) Places you have to drive to

b) Places you could get to without driving, but with difficulty

c) Places you could get to fairly easily without driving

d) Places you could get to using other transportation

Report and discuss collective findings in class.

Compile newspaper, magazine and other recent reports on what steps are being taken by government to alleviate the current energy shortage. Try to ascertain if progress is being made toward the establishment of a National Energy Policy. Determine what government agencies have direct or indirect responsibilities in the energy policy area so that a strategy can be developed for letting them know you are interested in their efforts and concerned about the overall problem. You may begin by contacting your local Congressman or Senator, or write as a class to: Common Cause, 11 West 42nd Street, New York, New York.

Every class member monitors for a one-month period the amount of kilowatt hours of electricity used in the home. (Monitoring should be done once a week for four weeks.) With the help of the data provided below and with the figures obtained, class members divide into groups of five and plan a strategy for utilizing 15% less electricity per month in each of their homes. At the end of the time period, determine how effective each family has been. What hardships resulted? What were the reactions of different family members? What is the likelihood that families will continue this energy conservation method?

"Energy Crisis: A Teacher's Resource Guide"
N. J. State Council of Environmental Education
Montclair State College
Upper Montclair, New Jersey 07043

(Source)

Concept: "Energy and Man's Environment"

Science
Economics
Social Studies

Modification.

The EME Program is a unique education venture developed to provide heretofore unavailable educational materials for teachers concerning the concept of energy and its relationship to man and his environment.

To insure easy adoption for any subject, each chapter has two main sections; learning objectives, by theme and grade; learning activities that correspond to the objectives. Each chapter has four major themes that can be applied to all curriculum. They are:

1. Scientific
2. Ethical
3. Aesthetic
4. Utilitarian

Grade Divisions include:

1. Primary
2. Intermediate
3. Middle and Junior High
4. Secondary and Senior High

Any of the following chapters can be used as they are modified to the individual student's need:

1. Why study energy
2. Uses of energy
3. Sources of energy
4. Conversion of energy
5. Environmental impact of energy sources and uses
6. Limits of the Earth
7. Future energy sources

Energy & Man's Environment
Activity Guide
Thomas F. Ris
2121 Fifth Avenue
Seattle, Washington

Concept: Science Fiction and Our Environment — Language Arts, Drama, Creative Writing

Modification

Using module number 67, from "Project Clean" unit on "Science Fiction and our Environment", have the students write short stories concerning the future. These stories could show how the cities or homes or businesses of the future will use their energy.

Suggest to the students some of the following ideas:

1. Types of energy to be used in the future
2. Energy-consuming appliances -- what will these appliances be like?
3. Types of transportation both for the family or one person or many people
4. Medical technologycal advancements because of energy (laser beams, etc.).

Along with the story, the students may wish to make an illustration of something in his story. Such illustrations could be used in a bulletin board display depicting "Life in the Future", etc.

"Project Clean"
Shawnee Mission Public Schools
Shawnee Mission, Kansas 66203

English
Typing

Concept: Cost of Operation in Relation to Energy Consumption

Modification

Using Module 47, "Keys to Pollution", communicate with local agencies concerning cost of operation in relation to energy consumption. Compose letters concerning one or more of the following ideas:

1. Ask for a comparison of operating costs between this year and last year or two years ago, etc. (They may want to give this in a percentage figure rather than actual cost.) Ask how their fuel consumption compared with operating costs.

2. Ask if anything has been done to help conserve heating and cooling in the buildings (or electrical use). if so, what were the suggestions so that others may benefit?

3. Ask if any energy-consuming changes are to be considered in the future. If so, what and how does the agency expect the change to help?

Arrange a field trip to the agency, if it is local. Ask the agency to show the students ways in which it has tried to conserve energy - so that perhaps this savings can be passed on to the consumer.

"Project Clean"

Concept: Economic Costs Related to Energy Costs

History
Economics
Social Studies

Modification

Using module number 45, "Industry and Ecology", a class could look at the economic costs of various industries in relation to energy costs.

Contact a factory or plant near you and ask for their help. You might want to find out the following:

1. What type of fuel do their use?
2. Do they use more than one kind of fuel?
3. Why do they feel that this is the most economical type of fuel for them?

BEST COPY AVAILABLE

4. Have they considered other types?
5. What means of transportation is used to bring in new materials? (noting type of fuel; is this most economic mode of transport, etc.?)
6. What means of transportation is used to ship product out? (noting same as above).

Arrange a field trip to factory so students can see energy in action. Prepare students by explaining briefly processes used and what type of fuel or energy consuming devices to look for.

"Project Clean"

Concept: What is a Watt? Anyone

Explain what is meant by an electrical watt. Have the students look up the words "watt" and "kilowatt" (and any other related worlds you may wish to include). Ask them to show eamples of "everyday wattage users".

Invite the science teacher, student or community resource person to your class to discuss or demonstrate these terms.

Social Studies
Science

Concept: Community Profile: Personal Indicator*

Survey to be done during class or as a "take home" exercise; possibly have announced ahead of time to the public on the radio or through the local newspapers. Explain what the students will be doing and that there will be a follow-up article.

Which of the following would you prefer?

a) a regular toothbrush	or	an electric toothbrush
b) a regular comb	or	an electric comb
c) ride a bicycle (short distance)	or	drive a car (short distance)
d) use a safety razor	or	an electric razor
e) take a tub bath	or	take a shower
f) use a fan	or	an air conditioner
g) fuel oil heat	or	electric heat
h) fuel-consuming fireplace	or	decorative fireplace
i) a Ford Pinto	or	a Lincoln Make IV
j) take a bus	or	drive your car
k) take a train	or	take a jet

* Adapted from "Deciding How to Live on Spaceship Earth; The Energy Crisis", p. 114.

Exercises:

1. Tabulate to see what your community's typical life-style is.

2. Do a "follow-up" article for the paper giving the results and comments from student committees on the following ideas:

    1. Why each answer could be right or wrong

    2. What danger do you see if this choice continues to be made in the future?

    3. Why use either answer - show energy-consumption facts, conservation facts, etc.

ROLE - PLAYING RECIPES

Science
Speech
Drama
Social Studies

Concept: Power Use and Power Payment*

For years Middletown was served by the Pacific Gas & Electric Company. (Participants may change names to fit Arkansas.) The company gave good constant electrical energy at a fair price. The residents were happy. However, in recent months with the increasing costs of electricity, some residents have been questioning the company's rate schedule. It seems that as one uses additional power, the cost per unit of power goes down. Thus, the more power you use, the cheaper it is, in terms of unit cost. This is further complicated by the town's tax structure, which tags on a percentage of the utility bill as a tax. Thus, if you are a family with a medium size house and use the average amount of power, you pay a high rate per unit for power. If you have a large house with air conditioning, electric heat, and many appliances, you actually pay less per power unit - and you pay less taxes than you would if the power charges were the same for everyone. Businesses and factories are included in this arrangement.

Increasing numbers of people are speaking out on the desirability of the company's rate schedule and the town tax policies. Their main point concerns the "fairness" of these rules and the environmental impact. They think that people using more of our non-renewable resources ought to pay for this and for the pollution, etc. On the other hand, the town officials say they want to attract new companies, and the power company says it's less expensive to serve large customers - so the rates are "fair".

*Taken from Deciding How To Live on Spaceship Earth, "The Energy Crisis", pp. 117-119.

The State Public Service Commission is going to meet in your town to discuss this problem and to adjust the rates if necessary. Select seven classmates to play the following roles. These seven people will appear before the Commission to present their positions and to support them with reasons. At the end of the hearing, the Commission (made up of the class) will vote on the issues.

1. Housewife
2. President of local power company
3. Sierra Club executive
4. Stockholder in the power company
5. Urban League member
6. Chamber of Commerce Executive Secretary
7. New resident in town
8. (Chairman of the Council to serve as narrator).

After role-playing, conduct a discussion, to let each person explain why they played the roles they did. Explore these roles and the interpretations of them and see (1) how we would feel about the issue if we were in one of the roles, and (2) if we can really "get into" another person's role as he sees and feels it.

Concept: Utility Management

Science
Social Studies
Speech
Drama

The 5M Coal Company already has several working coal mines at various places all over the state. They have recently located a new promising site at which they propose a mining operation that would exceed the out-put of most of their other mines now in operation. The Company is an environmental conscious corporation; thus, they want to assure the townspeople that their town will suffer no ill effects, even though the mining operation will be an open-pit operation. The complete operation will include mining, processing, and marketing the coal which would open up many new jobs and help boost the community's economy.

The company has always made a great effort to leave the mined area more improved than it was before they started mining, but still there are a few influential townspeople who have heard about the terrible condition so-and-so company left their mined areas in. These people point out that they have heard how other similar operations disrupted the countryside, caused loss of farming and cattle land and, in general, lowered the economy of the community -- thus they question if the 5M Company should be allowed to enter their community.

Have members of the class assume the role of the following people and present their cases to the City Planning Council. After the pros and cons, the Council will vote on whether or not to allow the 5M Coal Mining Company to set up operations in their community.

Mr. Dotson - 5M Planning Supervisor -- points out more jobs, improved areas, etc.
Mr. Jay - 5M Economist -- raise economy, need for new types of business and community growth.
Mr. Ames - town merchant -- chairman of the Merchant's Association -- economic value to community
Mrs. Turpin - housewife, mother -- points out dangers to children since mining operations will be near town park
Ms. Carrier - local self-appointed ecologist -- points out environmental disruption of strip mining and use of harsh chemicals in processing, etc.
Town Committee - - concerned about possibility of "dirty air" from processing, etc.
City Planning Council - class members -- will need chairman to act as narrator.

Science
Social Studies
Drama
Speech

Concept: Utility Power Source Decision

Students will pretend that their community is to have a new electrical utility plant installed. The source to drive the plant has not yet been decided and several options are open. A hearing before the *City Council and Planning Council wants a plant that would be the most economic to operate and with the least possible pollution factor. The Council will hear from several interested companies, then decide which should be best suited for their community.

Research the possibilities of using coal, oil, natural gas, hydroelectric, nuclear, geothermal, tidal, solar cell, or hydrogen. Have representatives from each possible power source meet with the Council. Narrow the possibilities down to two or three companies, then have those companies and concerned citizens who are for and against the plant all meet before the Council and present their sides. The Council will then vote on the kind of power source they feel is best for their newly proposed much-needed power plans.

*The Council will be of those of the class not participating in the presentation. There will need to be a chairman or Mayor to act as narrator. You may also want to have two or three representatives from the Council to help the Mayor bring out certain information the Council should know in order to vote properly.

GAME RECIPES

Concept: The Planet Management Game — Anyone

This game deals primarily with population, income, food and environment. The game can be planned with the idea of how much and what kind of energy could be used to accomplish the events of Planet Clarion. Energy will have to be a discussion part of the game, since no score cards or rounds were written up for this aspect.

Planet Management Game
Educational Research Council of America
Houghton Mifflin Company
6626 Oak Brook Boulevard
Dallas, Texas 75235

Concept: Energy Puzzle

A crossword Puzzle entitled "A Chance to Solve the Energy Puzzle" is available from:

Energy Tab
Seattle Post Intelligencer (Feb. 18, 1974)
Seattle, Washington

BULLETIN BOARD RECIPES

"Don't Be Fuelish" 75 cartoon-captions on energy conservation - for free booklet:

Energy Conservation
Box CW
Washington, D. C. 20240

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Frani Shaver Landa
Woman's Day, February 1973

2. "Deciding How to Live on Spaceship Earth"
Rodney F. Allen and others
Plover Books, Terrace Heights, Winona, Minnesota 55987
St. Mary's College Press 1973

3. The ABC's Of Converting to Electric Heat
A Scroptographic Booklet 1972
Chaning L. Bete Co., Inc.
Greenfield, Mass.
(Available through A P & L)

4. Watts Going on Where You Live?
   General Electric Power Saving Guide to Major Appliance
   Energy Conservation (Available through A P & L)

5. Energy & Man's Environment - Activity Guide
   Thomas F. Ris
   Available from: Energy & Man's Environment
   2121 Fifth Avenue
   Seattle, Washington 98121

6. Electric Energy for the 80's
   Answers to Questions about White Bluff Stream Electric Station AP&L

7. More Miles From A Gallon of Gas
   "Cars" - Peter Stephano
   Better Homes & Gardens, September 1973, page 10

8. Different Ways to Heat Your House
   Changing Times
   The Kiplinger Magazine, September, 1974, p. 45-47

9. Consumer Tips on Using Electric Energy
   The Louisiana Jaycees
   The Louisiana Consumer League
   Louisiana Power & Light Company
   (Available through A P & L)

10. Energy and Economic Growth Teacher Guide
    Haig Babian
    Available from: American Petroleum Institute
    1171 Avenue of the Americas
    New York, N. Y. 10020

11. In the Grassless (?) Summertime
    Bob Behme
    Field & Stream
    September 1973, p. 124-126

12. Fuel Economy - Consumer Information
    Ford Motor Company

13. The Closer you Look - Fuel Economy Book
    Ford Motor Company

14. The Energy Management Handbook
    The Ford Motor Company

15. How to Use Electric Heat for All It's Worth
    Electric Energy Association
    90 Park Avenue
    New York, N. Y. 10019 (A P & L)

16. Citizens Action Guide to Energy Conservation
Citizens Advisory Committee on Environmental Quality
1700 Pennsylvania Avenue, N. W.
Washington, D. C. 20006

17. The ABC's of All Electric Mobile Homes
A scriptograph Booklet
A P & L

18. Energy? Energy. Energy!
Science World (Whole Issue on Energy)
902 Sylvan Avenue
Englewood Cliffs, N. J. 07632

19. 75 Ways Not to be Fuelish (Cartoon & Caption)
Write for free booklet to:
Energy Conservation
Box CW
Washington, D. C. 20240

20. Energy Crisis - A Teacher's Resource Guide
New Jersey Education Association
180 West Side Street
Trenton, New Jersey 08608

21. Information on Energy
Richard W. Longing, Director
Arkansas Department of Commerce
151 Capitol Building
Little Rock, Arkansas 72201 (501-371-2231)

22. A P-I Special Report: Energy Awareness
Seattle Post-Intelligencer
Newspaper in the Classroom Program
P-I Education Department
206-622-2000 -- Ext. 423

23. "Project Clean" - Write:
Shawnee Mission Public School
Project Clean
7235 Antioch
Shawnee Mission, Kansas 66203

24. "Hidden Waste" - Potentials for Energy Conservation
The Conservation Foundation
1717 Massachusetts Avenue, N.W.
Washington, D. C. 20036

MATERIAL AVAILABLE THROUGH A P & L

1. "The Energy Challenge" - film
   25 min., analysis of national energy shortage,
   steps to be taken to meet shortage
   AP&L, John Heuston, Public Affairs Department, Little Rock

2. "The Return to King Cool" - verbal presentation
   15 min., 1973 - Redfield, Arkansas

3. "Good Old Days" - slide presentation
   15 min., 1973 - flashbacks, available through local A P & L

4. "Dialogue on Energy" - tape set
   Available from Joel Patterson, A P & L, Environmental Affairs, Little Rock

BOOKS

FUTURE SHOCK, Alvin Toffler, Bantam Book, Random House, New York, $1.95.
Deals with people's response to change.

OTHER

ENVIRONMENTAL EDUCATION RESOURCE GUIDE, 1973. New Jersey State Council for Environmental Education, Office of Environmental Education, Trenton, N. ,. Lists multi-media materials.

SCIENTIFIC AMERICAN, September 1971. Vol. 224, No. 3. Issue devoted to Energy and Power.

P O P U L A T I O N

Neil Cole

INTRODUCTION

A few people in this country still question whether the world has a population problem and a few more people that question whether the United States is part of the world population problem.

Let's consider these facts. The world population is presently increasing every year. This is not because people are having more babies -- it is that fewer of us are dying. There are presently more people than the available food supply, or at least more people than the proportionate amount of protein the world produces.

World projections for the year 2000 range from a low of 5 billion to 8 billion. Present trends indicate we might approach that upper limit. Even if you consider estimates as inexact, this still amounts to a great number of prople for our world considering that we are not adequately caring for our less than 4 billion now.

The answer to this situation is simple to state -- either the birth rate must go down or the death rate must go up in order for us to attain zero growth in the population. All of us will admit that at some point we must face this fact, and that the former solution is more palatable than the latter solution. The problem is when and if we will be able to get ALL people to agree to lowering the birth rate.

A number of arguments have been presented as to whether the United States has a population problem. A number pose the argument that the number of people per square mile in the United States is smaller than that of other countries and that population problems within our country are the result of crowding in our cities; not in numbers of people. Others point out in their arguments that the United States population is growing every year though at present at a slower rate, plus the fact that the United States consumes most (approximately one half) of the world's goods.

Considering the present shortages and those that the world will encounter in the near future (your students' lifetime, if not yours) what action will our country, which uses so much, take in a world that needs so much?

POPULATION

RECIPES:

Drama
Social Studies
Science

Concept: Survival on Limited Resources.

To introduce the concept of a growing population trying to survive use the first simulation in Deciding How to Live on Spaceship Earth, pages 2-4. Three situations, a shipwreck, life in a commune, and a plane crash are illustrated along with a list of possessions or salvaged items. Have your students decide how they are to best use what they have in each situation. The catch to this simulation is that after they have decided how they are to survive, more people are added to each of the groups. This may change each situation greatly.

Concept: Effect of Crowding

Anyone
Psychology

For younger students, you may want to try an alternate activity. You will need to obtain the help of two or three additional teachers in this activity. Each teacher will explain to their classes that they will be viewing a film in your class. Have a film projector set up in your room. (you will not show a film. You will simply go through the motions and stall). At various intervals each of the additonal class will file into your room. When you think you or the classes have had enough, stop them and tell them that this was an exercise in crowding. Have the classes adjourn to their prospective room where each will discuss their feelings and what happened to them in this situation.

Concept: Limited Space

Math
Science
Social Studies

Using Chapter 1 in L. M. Schaefer's text Population, Environment, and Society. 625 Orange Street, #38, New Haven, Conn. 06511, approach the topic of limited space. Schaefer's begins the unit with a series of math problems which you may need to adjust to the learning level of your students or adjust some of the dimension given (particularly concerning land) to your region of the state.

Concept: Population Growth

Economics
Science
Social Studies
Math

(a) Chapter 3, "Population - The Growth and Distribution of Human Population" of Schadfer's book gives a rather lengthy explanation of population dynamics. We feel that this chapter is excellent preparatory material for the teacher, but due to the great amount of math involved, students'

interest in this unit must wane. We feel a short version of Schaefer's chapter 3 coupled with a demonstration presented in Zero Population Growth's Equilibrium, January 1974, Volume II, No. 1, page 29, would be a better method. Ms. M. Pacynski, St. Mary Center for Learning, Chicago, Ill., designed a demonstration using two burette's, one to allow drops of liquid into a container and one to allow drops to exist in the container to illustrate population changes.

(b) Have the class read the first chapter, "The Problem", of Dr. Paul Ehrlich's book, "The Population Bomb". Dr. Ehrlich's book is very readable but somewhat frightening.

(c) Chapter 4 of Population, Environment & Society discusses the effect of population on society such as age structure, urban planning and resource use. Many major concepts are covered in this chapter. We suggest that instead of the simulation, brain-storming game on page 140, you substitute the game "Population 2000" that was produced by the Denver Chapter of ZPG. This game is somewhat broader in scope and is easier to play. Dr. Ehrlich covers scenarios of the future in his second chapter, "The Ends of the Road" from the "Population Bomb". See p. 39 for game.

(d) Chapters 12, 13 and 14 in Introduction to Environmental Science, Concerns the population problem. Chapter 12 gives a broad background, including Western attitudes on family size and the age-structure of world population.

Chapter 13 concerned with urganization and depersonalization. Even students from the most rural part of our state have experienced some of the symptoms of crowding discussed in this chapter. Encounter 5 in Deciding How to Live on Spaceship Earth; "Design for Urban Living" has some excellent activities for developing concepts in these areas.

Chapter 14, in the Introduction to Environmental Science, is an excellent study on the economics of the population problem. One of the important topics mentioned is the relationship between quality of education, productivity and income.

Concepts: Population Solutions

Economics
Social Studies
Science

(a) Dr. Ehrlich assessed "What Need to Be Done" the title to his fourth chapter of the Population Bomb.

(b) "Options" is a publication of the Populations Reference Bureau and is an excellent activity guide for classroom use. It guides students through not only the problems of population growth, but it also exposes the students to a number of alternative futures based on differing population growth rates.

(c) Chapter 5, "Strategies for the Future" from Population, Environment, and Society discusses possible solutions and has an excellent summary of the Commission on Population Growth and the American Future.

(d) For a view on policy making and its consequences in regard to population growth, have students read chapters 20 and 21 of Phillips Foster's book, Introduction to Environmental Science. This is an excellent approach to the problem solving approach.

Concept: Population, traffic & Pollution

Math
Science
Social Studies

Have your class investigate the effects of traffic on two different streets in your community. The class will select two streets, one that has heavy traffic, and one has light traffic. The class should be divided into five groups to investigate the following:

1. Particulate Matter - Place slides smeared with petroleum jelly on selected sights for 3 to 6 hours. Compare under microscope.

2. Litter - Collect litter on either side of the road (6 feet on each side). Compare amounts.

3. Noise - Compare tape recordings of sounds.

4. Traffic & People - For 15 minutes count the number of passing cars, number of people in cars, number of people not in cars (bikes, walking).

5. Senses - Students will describe the smells and sights and their reactions to them on both streets.

Concept: Enemy

Science
Social Studies

Find the Enemy: Have your class through research vote on what is the most serious pollution problem in their community. Then have them trace it to its source. Through discussion, help your students see that we all are involved in the reasons that we have our problems.

Concept: Increasing or Decreasing

Social Studies

Have your students find out if their community is decreasing or

increasing in population through student interview check, school enrollment, Mayor and police, etc.

Concept:

Math
Social Studies
Science

What is a Billion - The phone book and a billion.

It is very hard for students to visualize 4 billion people or even 7 billion in the future. An excellent exercise from the Population Reference Bureau, Inc., 1755 Mass. Avenue, N.W., Washington, D. C. 20036. Visually illustrate this concept, imagine a square, 1 inch on the side, filled with 2,500 dots (50 dots to the linear inch - 2,500 dots total). Using this format, fill an 8 x 10 inch paper with dots for a total of 200,000 dots on the page. If you continue this idea and fill a Little Rock phone book (approximately 1,000 pages) with dots you would have 200 million dots.

1 Little Rock phone book - 200 million (as population now)

5 Little Rock phone books - 1 Billion

19 Little Rock phone books - Less than 4 Billion (world population).

36 Little Rock phone books - between 7 and 9 billion (projected world population in the year 2000).

Your students might want to try to construct the square inch of dots.

"POPULATION 2000"

Social Studies
Home Economics
Science
English

RECIPE GAME

INTRODUCTION

"Population 2000" is a future-oriented, problem-solving game for classroom use. One goal of this game is to allow students to discover the consequences of the collision between a growing American population and American over-consumption. The game was originallly produced by the Denver Chapter of ZPG and was later revised by the Environmental Education office, Arkansas Department of Education.

Begin by having students calculate their age in the year 2000 and jot down a few ideas on what they think they might be doing then -- age? family? job? life style?

The following is a brief sample of that game and its rules. It is hoped that this would stimulate teachers to write their own scenarios and expand the game for their own uses.

RULES

Divide the class into small groups; have each appoint a recorder.

I. IT IS THE YEAR 2000 ---

A. Give each group a "scenario" from the year 2000.
B. Request each group to brainstorm all the problems which should have been solved in the early 70's, 80's and 90's to solve the problem before it became momentous by the year 2000.

Brainstorm - WHAT WENT WRONG

The rules of brainstorming are:

1. Think of as many ideas as possible
2. Do not evaluate anyone's idea initially. Encourage everyone to throw out ideas, no matter how impractical they may sound. An impractical idea might spark a more practical thought by someone else.

C. Each group should then rank most important things that went wrong during the 70's, 80's and 90's.

D. Have all groups come together and read each problem assigned and then read the list of things that went wrong. Encourage everyone to comment on the ideas raised by each group.

II. IT IS THE YEAR 1975 ...

A. After all groups have made their presentation and jotted down any comments made by others during the presentation, request that the groups meet separately once again.

B. Have each group brainstorm actions which could and should be taken NOW to prevent their specific problem from reaching monumental proportions by the year 2000: BRAINSTORM WHAT CAN BE DONE NOW IN 1975.

C. After the brainstorming session, have each group research their possible actions and rank in order of importance five to ten steps for action. Allow a few days for the research.

D. Bring all groups back together again and have each group submit its recommendations.

E. Direct a group discussion with the entire class (ten to fifteen minutes) so that the other students may add their ideas to each scenario. Limit time, however, so that the discussion doesn't overwhelm individual group ideas.

F. Follow-up: Have your students write their own scenarios.

SCENARIOS

I. DEMOGRAPHY

On April 22, 2000, an announcement was made by the CCCP (Commission on the Coersive Control of Population) that as much money will be spent on Birth Control as has been spent in the past on Death Control.

On the same day, a 15 year old female, #523-689-SW-AB-F, completes a questionnaire re: her physical health record, her family's health record, the number of people alive in her family. She undergoes a series of tests to determine her genetic composition. She is then interviewed by a panel as a reproducing female when she reaches age 28, which is the age the government has statistically set as the beginning of her reproductive years, <u>if</u> she is found legally qualified.

II. SPACE

Morning News...KUSA...April 22, 2000...

The Arkansas Parks and Recreation Commission announced today that all families desiring picnic sites for daily excursions this Spring will have to arrive at waiting areas near the park entrance before 6:00 a.m. No more reservations will be taken for camping sites for weekly summer vacations. Reservations for these sites were filled during January and February.

Families defying restrictions on mobility are still forming caravans of cars leaving the depressed Bos-Wash (Boston-Washington) heading for western and southern open spaces. Progress of the first caravan is reported at five miles per hour on Interstate highways.

III. TECHNOLOGY

Excerpts from the Universal Bureau of Investigation newsletter -- for UBI classified employees only:

The UBI has completed installation of its "Every Home and Family Satellite Surveillance Network" (EHFSSN) which will facilitate the UBI's setting up of in-depth recording of family migrations, family over-consumption and black market activities.

IV. RESOURCES

The minutes of the Arkansas Resource Board meeting on April 22, 2000 included the following committee reports.

Petroleum Resource Committee

Oil production in South Arkansas is proceeding as rapidly as possible with three nuclear blasts daily to release the oil. However, in view of the shortage caused by current upheaval in the Middle East, coupled with the final depletion of Alaskan oil reserves, the Federal Petroleum Administration in conjunction with the PRC announced a severe rationing of petroleum destined for combustion purposes and suggested that all families should make plans to move in with two or three other families during the winter months to conserve fuel rations.

For more information write: Zero Population Growth
1346 Connecticut Ave., NW
Washington, D. C. 20036

AWARENESS

Will Parker

INTRODUCTION:

Facts are fine and sometimes easy to teach, but when does one feel?

Unless the student becomes deeply involved emotionally with his world, he will not feel it necessary for him to do anything about it himself.

Try to spend some time in the classroom asking students how they feel about areas of ecology and how they are affected themselves (Value Clarification). Perhaps you can start with the world and base an awareness program on that. Encourage students to see, touch, and smell the world around them.

Perhaps instead of asking students what they think about a problem or situation, you can ask them how they feel. To actually relate to the world, one must be, in effect, a sensualist. As Simon and Garfunkle said, we must "hug a tree because it's there".

Perhaps you can bring nature into the classroom in the form of leaves, twigs, flowers, etc. Remember, nature does not have to be "sweet" or "pretty" to be beautiful. As in people, a rough stone, a twisted branch, a head of grass, may have great beauty just as an ugly-person may have beauty of character.

Field trips where students do not measure or test but on which they look, smell, and touch nature may get them emotionally involved. Feel the texture of the bark on a tree. Hear the birds call about the rush of a stream, see the sun filtering through the boughs of a pine tree.

We must involve ourselves and our students deeply in nature and our world if we are to improve it. Only after emotional awareness of both student and teacher can effective action be expected.

ARKANSAS, WE LOVE YOU

English
Art
Social Studies

Objective:

Upon completion of this project, the student will be aware of the beauty of his state and his part in restoring and preserving that beauty.

INTRODUCTION:

Play a recording of Arkansas, or have the class sing the song. Display photographs of the state bird and flower. Are you proud of your state? What are some places in Arkansas that make you proud? Tell about some places you have visited. (Ozarks, Petit Jean, Bull Shoals, Blanchard Springs, etc.). What evidence of man can you see? Good? (paths, lighting, etc.) Bad? (Litter, ugly tourist courts, unattractive lights).

RECIPE:

Try to visit a state park or an area of local interest (natural, not man-made). Have the children point out and discuss the natural beauty. Discuss man's negative contribution. The Arkansas Department of Parks and Tourism has an Environmental Education Program to assist teachers and students in the parks or in the classroom. For information, write Mr. Jim Killer, Coordinator of Environmental Education, Ozark Region Office, Arkansas Parks and Tourism, Dardanelle, Arkansas, 72834.

Assignment:

English: Write a composition or poem expressing your pride in Arkansas and its natural beauty and/or man's despoiling of it.

Art: (a) Paint or draw a picture expressing "Pride in Arkansas".
(b) Have a contest for the best picture. Display all pictures prominently.

Social Studies: Discuss the economic possibilities and contributions of Arkansas' scenic areas. Make a chart showing the present economic advantages of each.

Follow-Up: Make liberal use of local radio and newspapers. Request that students' poems or stories be read over the air or published. Ask a local bank for display areas for art works. Interest scouts or other civic organizations in cleaning up scenic area.

ME A TREE

Language Arts
English

Objective:

Upon completion of this activity, the student will be aware of the importance of trees to the world, not a trees' place in the life cycle or as a raw material, but as an element of life itself.

INTRODUCTION: Read Joyce Kilmer's "Trees"

What is a tree" Have you actually seen a tree, or is it something which only shields you from the sun and ran and supplies certain raw materials? As Joyce Kilmer did, have you ever thought of a tree as a person? Let's have a brief love affair with a tree:

RECIPE Arrange a walk through a wooded area. Allow students to roam at will, but encourage them to touch the trees, lean against them, sniff the bark and leaves, smell the flowers, etc. However, don't break! After a somewhat long period, call them back and discuss what you've learned.

Assignment:

Language Arts (a) Write a composition or poem about "Me As A Tree". Imagine yourself as a tree (a pine, a sturdy oak, a weeping willow) and tell how it felt as a tree. Who were your friends? What did you do for them? Have you thought of trees as having a personality? Write a composition or poem in which you describe the character and personality of a specific tree. Do not describe how the tree looks.

(b) Write a story about the population of a tree. Imagine all of the creatures who live there and how their lives may be affected by changes in the weather, etc.

Art (a) Take rubbings of various textures found on one tree; bark, leaves, flowers (if any), fruit, etc. Use either charcoal or pastel. Combine them all together into a collage.

(b) Draw or paint a "portrait of a tree". Choose one with obvious personality and character.

(c) Draw or paint yourself as a tree. Which would you be? What would you look like?

"MY COUNTRY TIS OF THEE"

English
Art
Music

Objective:

Upon completion of this project, the student will be aware of the beauty of his country, and, hopefully, will have increased his pride in America.

Appropriate reading: "As the Flag Goes By",
"America the Beautiful",
"The Star Spangled Banner, and
"The New World Symphony".

Choose as many photographs and prints of America's beauty (Grand Canyon, Yellowstone National Park, Ozark Mountains, etx.) and display them as effective as possible.

INTRODUCTION

Point out that despite what politicians have done with and to our country, we have a great deal to take pride in. Ask the students to tell of sites of natural beauty they have visited. Hopefully, many will have visited areas in Arkansas (Hot Springs, Ozark Mountains, Bull Shoals, Fouke, Stuttgart, etc.) as well as great national parks (Grand Canyon, etc.).

RECIPE: Concentrate on our own area. We have much to be proud of. Look around yourself this weekend (or week, - give them plenty of time). Find a place of great natural beauty near you. What would it be like if human beings had not discovered it?

Assignments:

English: (a) Describe the site you have selected as clearly and as exactly as you can. Try to get your audience to actually see it.

(b) Write a "compare and contrast" paper in which you describe your site as it is now and as it was before man encroached upon it.

Art: Make a drawing or painting of the site you have chosen - either as it is or as it would be again. (Have an art display in a prominent area. Make certain it is labeled appropriately so the students are aware that this is <u>their</u> area).

Music **: Choose the tune of a familiar sone and write lyrics to it describing the site or area you have chosen.

** It is a related activity, some groups might choose one or more sites and clean it up. Also, stories, poems, and photographs might be submitted to the local newspaper for publication. The <u>community</u> needs to be aware of what it has.

FEELING FOR WHAT IT IS

Language Arts
Art
Music
Photography

Objective:

Upon completion of this activity, the student will be aware of the beauty of the earth and of the ugly additions man has made to earth.

RECIPE: Read Edna St. Vincent Millay's poem, "God's World" - (this is season, a reaction to the beauty of an autumn day). Follow with a discussion of the changes the world goes through as seasons change.

Trees change colors
Leaves start to fall
Grass begins to turn brown
Some fall flowers (asters, etc.)
begin to bloom

Suggested music for background:

"September Song"
"Autumn Leaves"
"Tramuri"

Ask the students how they feel about the world at this time of year? Ask that they be specific, i.e. "Setimental as I think about the happy days I've had this summer". Sentimental? Expectant? Sad? Happy?

Suggested Activities: Take the students for a walk around the campus or through a wooded area if at all possible.

Language arts: Upon return, have the students discuss their reactions to the world. Ask what they noticed that Gog did not place on the world. Write a story or poem about the world as it is now. Haiju or anagram are good here.

Art: As the group walks, collect leaves, tweigs, etc. Upon return to class, choose autumn colors and ma design of rubbings of the leaves.

Choose a site overlooking a heavily populated or industrial area and ask the students to draw it as it was before man changed it.

Music: Upon completion of the discussion, or walk, ask the students to suggest appropriate songs which could be put together in a cantata. Perhaps you could present an assembly using appropriate slides as background.

Follow Up. Have an Earth Day Celebration in which all of these activities are used.

Photography or Camera Club: Choose a time of the day when lighting of your area is most dramatic and photograph it. Make lay-out prints and mount them for display.

OH, SAY CAN YOU HEAR

English
Art
Science

Objective:

Upon completion of this activity, the student will be aware of the daily assault upon our ears by "common" daily activities.

Ingredients: (cassette tape recorders)

Pre-planning - quietly assign several students each a tape recorder and a specific noise to record. (T.V., radio, rock band, traffic, vacuum cleaner, etc.) Have them bring them to class on a specific day and play them on a pre-arranged signal and stop on another.

INTRODUCTION - (Following noise of tape recorders): There! Wasn't that terrible! As bad as it was, there are noises you hear every day, some of them without you even being aware of them. Now, let us listen to some noises individually. Where would you hear them? When? (Play individual noises and let students discuss them). Are they really necessary? How do you feel when you hear them?

RECIPE:

English: - Write a composition or poem about noise and how it affects you.

Art: - Play the noises all together again and ask the students to draw or paint how they feel. (Given time enough, these shoould be wild and creative).

Biology or Science - Study the biological effects of noise.

Materials - Chapter 8, 16, Introduction to Environmental Science. (1) Statistics On The Nature of Sound as Well as the Effects on living organisms of noise.

Encounter 2 - "Noise; the Unseen Pollution", contains simulated situations which develop attitudes on noise-related problems.

Deciding How to Live on Spaceship Earth. Source of Idea.

SPIDER'S WEB

Art
English
Biology

Objective:

Upon completion of this activity, the student will be more aware of the complexity of his environment and the interrelations to be found in nature (Early Spring would probably be best for this activity).

RECIPE:

Find a poem or poems about spiders and spiders' webs (Robert P. T. Coffin hasseveral). Try find some which express their beauty and some their danger. Have you ever considered the spider and its' web. In one way it is like an early belief about the universe. Do you know how? (Sun-Center of Universe). Let us go out and find some webs, and, perhaps, bring them back.

Ingredients needed:

Plastic Spray Enamel (bar) several cans
Polymer medium
Black paper or poster board cut into rectangles

Activity: Take a walk through a wooded area or along a fence, preferably one with several strands of wire. Early morning is best for this activity. Locate a spider's web and carefully spray it with several coats of clear enamel. Point out the wires, twigs, etc., which support the web. Allow the enamel to dry a few minutes. Several people will have to join together to carefully lift the web from its moorings and attach them to a piece of dark paper using the polymer medium at each corner.

Assignments:

Art: (a) Design a spiders' web of your own. Using a scratchboard technique, scratch your own design for a web.

(b) Imagine you as a spider weaving a web, using yard, thread, etc., weave a web of you own. What will support it? How will it handle? If you do not wish to destroy the webs, have students do pen and ink drawing on white paper. Of course, you'd not want to kill the spider).

English: (2) How would you feel as a spider? Is the web really your home, or does it serve another person? Could you be a kind spider, or would you have to be cruel? Write a composition or poem about yourself as a spider.

(b) What if you were caught in a spider's web? How would you feel? What would you do? Write a composition or poem about yourself caught in a web.

Biology: Describe the importance of the web to the life of the spider. What things occur here? If you don't know, watch and see.

BORED WITH BILLBOARDS?

Art
English
Economics
Psychology

Objective:

Upon completion of this activity, the student will be aware of how much of the world is actually hidden behind signs and billboards.

Pre-Planning: That photographs of billboards around your community and bring them to class, or count the number of signs you see on your way home from school, other than those on buildings.

RECIPE

"Class, I have some photographs here. Have you seen any of these? Where? What do you suppose is hidden behind those signs. Isn't that a terribly expensive way to mark nature? How would you feel if you were forced to stand behind a sign all day?

Assignments:

1. Art: a. Design the back of a billboard and stand behind it. How do you feel? Left out?

   b. Choose a billboard and draw what stands or lies behind it.

II. English: A. Discuss the grammer to be found on billboards. Are they really useful. Could we do without them? Write a letter to one of the advertisers asking him to consider removing his sign.

   B. How does it feel to be hidden behind a billboard? Pretend that someone has erected a large sign in front of you. Write a letter to the world describing yourself and how you feel.

Follow-Up. Other than billboards, what other evidences of visual pollution can you find? Bring photographs or drawings of them.

Economics or Psychology

1. Why do billboards exist? Get into the psychology of the advertising business. Do we buy the best product for the price or that product whose name we see or hear most often?

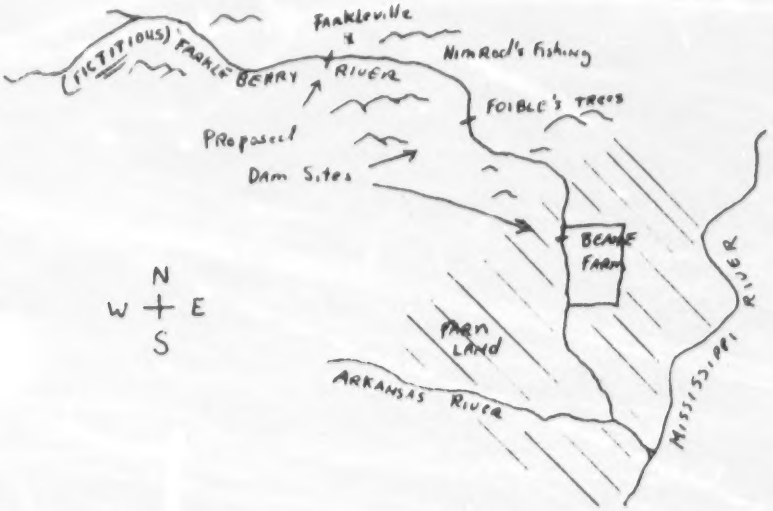
2. Do a survey on why people buy products - billboard advertising, magazine or newspaper advertising, radio or television advertising, or word-of-mouth advertising?

THE FARKLEBERRY QUESTION
A Simulation Game
All of Us
Wrote This

Teacher Background Information.

The Farkleberry River is a winding river in Northwest Arkansas which empties into the Arkansas River. In 1935, Congress passed legislation which enabled the U. S. Earth Projects Service to begin flood control projects on several Arkansas rivers, including the Farkleberry. In 1975, the Service decided to begin a feasibility study on the Farkleberry. If the Service determines that the project is feasible, a series of three low water dams will be constructed.

In its present natural state, the Farkleberry River is characterized by a swift flow - deep pools, separated by rapids. High cliffs along its headwaters add to the scenic beauty of the river. Fishing and hunting along the river is a source of recreation for many sportsmen in the area. However, the rich farmland along the lower portion of the river floods once or twice yearly.



A hearing is to be conducted by the Service as to whether the project should be started or if the project should be dropped.

Teacher should appoint a moderator for the hearing and either select or allow four others to volunteer to serve on the Hearing Board.

1. The day before the activity, assign roles to allow participants to prepare and make name plates for board members and witnesses.

2. The first day of the activity, give background information have moderator introduce board members and witnesses, and begin three (3) minute presentations (with each witness being questioned). This will probably take one class period.

3. At the beginning of the second day, allow a brief summation (no longer than one minute) followed by discussion period. Allow each to sum up and the board retires to discuss the vote. They may or may not have time to give their decision at the end of the second class period.

TO THE TEACHER

Some periods of this role-playing situation - the 15 minute discussion period, for example, may be very noisy, with students moving around. However, communication should take precedence over repressive discipline.

Tell the non-participants in the class that they will vote while the board is adjourned reaching its decision. The class should consider the economic and environmental factors that are involved in having the project or in not having it. After the board decision, discuss why the vote turned out the same or differently.

HEARING BOARD

RULES FOR THE BOARD MODERATOR:

1. He calls each witness to testify. A witness has three minutes for his presentation, he may be questioned by board members and other interested witnesses, as well as observers, at the discretion of the moderator.

2. After all witnesses have spoken and been questioned, the moderator will declare a 15 minute recess for discussion among witnesses and board members.

3. After the discussion, the moderator will call for a one minute summation from each witness.

4. When witnesses have summed up, the board to retire to another room, if possible, so they can discuss the questions freely. They must agree either "Project" or "No Project", using a vote of at least 3 out of 5. They must reach a decision even if it involves calling back witnesses or proposing alternate plans.

RULES FOR BOARD MEMBERS:

1. Listen to each witness carefully. After his testimony, you may question the witness or any other witness who has testified. Weigh carefully the economic and environmental factors involved. What are the costs, short term and long term, benefits? What will be Lost? Consider alternate plans.

2. During the discussion period, try to convince other board members to adopt your way of thinking.

Rules for Board Members Continued.

3. After you have voted, be prepared to explain why you voted the way you did.

WITNESSES

1. Read your background information carefully and play your role as closely as possible to the background. Your background is brief. You may want to do some additional research or make up some additional information. Have some facts and figures available. You will have three minutes to tell the Board your point of view.

2. Be as persuasive as possible in convincing the board to vote your point of view. You may not agree with your position, but a good actor can play any part. Play it to the hilt.

3. Listen to the other witnesses carefully - you may question or contradict their testimony. Remember that the Board will be deciding based on what information you give them.

4. If you are asked a question you cannot answer, remember that witnesses in a real hearing do not always have all the answers.

5. Witnesses should number 8 pieces of paper, 1 - 8, and draw for the order of their presentation, the person drawing number 1 presenting first, and so on through 8.

BUFORD BEANE

He has farmed his acreage in the Farkleberry bottoms for 25 years. He has fought flooding, having to replant or losing entire crops and livestock for the 25-year period. Though the flooding brings in rich top-soil, the effects of a flood control system would boost farm benefits millions of dollars.

Mr. Beane's knowledge of agriculture makes him one of the most respected farmers in the region. He feels that the long-range increase in productivity per acre makes this project very attractive.

His workers lose many hours in the field due to the flooding problem. Also, the unexpected flooding has caused not only loss of crops, but also loss of livestock.

ANDY R. NIMROD

Andy has hunted and fished in the Farkleberry region all of his life. His father took him on many hunting and fishing trips up the Farkleberry when Andy was a boy. He has a conservationist's appreciation for the beauty of living things.

The possibility of a dam project on the Farkeberry threatens Andy's way of life. He knows that the game fish which live in the swift waters of the Farkleberry will not be found in the slow-moving currents of the impounded waters. Carp and Shad will take their places in the changed ecosystem. He is also afraid of the changes in animal population due to loss of habitat.

Andy wants the chance to take his young children into the area as it exists today. He would like to insure that they have an opportunity to enjoy and appreciate the natural areas of the Farkleberry in the future.

COL. "MAC" MacGRUDER

Col. "Mac" MacGruder (retired) does occasional consulting work as an Engineer, for the U. S. Projects Service. He is a forthright individual, and is very forceful in his presentation. He has been involved in flood control since 1955.

His main selling point for the project is the controlled flooding of the Farkleberry vs. uncontrolled flooding. He realizes and appreciates the conservationst's priorities in saving the natural beauty of the area. However, he feels that the demand for the agricultural products of the region must also be considered. He points out that the crops lost to flooding could be feeding our ever increasingly hungry world.

He is sympathetic, yet tough. He feels we must establish priorities, and obviously, we cannot appreciate natural beauty if our stomachs are empty.

ORSON FOIBLE

A retired Legislator of Arkansas, his grandfather was the first settler on this stream and had named it for the large number of Farkleberry trees that he discovered there. One of the proposed dams would cause this area to be flooded and this scenic Arkansas spot would no longer be. Mr. Foible takes great pride in being "a country boy" and dresses and talks accordingly. When running for office, he wore carefully rumpled clothes, played a fiddle, and used as many rural expressions as possible. This attitude continues in all public appearances. He says: "My fondest memories as a barefoot boy are of fish' on the banks of the Farkleberry River with a bent pin and a can of worms. I picked Farkleberries there. My mother made them into some good eatin' pies. A dam will flood out them trees and thousands of Arkansas farm children will never taste another Farkleberry pie! Fishin' will be ruint for generations to come".

DR. GERTRUDE ALTHEA WHITEHEAD

Dr. Whitehead is head of the Biology Department at Northwest Arkansas University. She was director of the feasibility study for the Farkleberry project. She is well respected by her fellow scientists in the State for her methodical studies.

As a result of her study into the environmental impact on the river by a series of low-water dams, she recommends that the project proceed. She feels that the claim by conservationists that the project will eliminate the wildlife of the region is unwarranted. As a biologist, she makes the point that although the species of animals will change, there will still be a diversity of fish and animals to hunt.

She feels also that the need for food from the farmland in question far outweighs the need for areas for aesthetic appreciation.

RALPH E. RADER

He is a dynamic young lawyer who is the official representative of the Arkansas Center for Environmental Preservation. The Center continues to be involved in hearings of environmental significance all over the State.

Ralph makes the point that the proposed project will simply be trading one type of flood for another. The short-term high flood in the lowlands will be traded for long-term low flooding in the area and in the upper regions of the river, there will be flooding where there was none before.

The water table in the highlands will remain at a higher level than before the damming of the river. The table would fall in the lowlands.

He is a no-nonsense, committed individual. He says that Mother Nature knows best and this project will simply produce flooding where it has never flooded before. Ralph feels that the Service is basically a good organization but they tend to view environmental problems and their solutions through the eyes of engineers.

NOLAN HARDGRAVES

Mr. Hardgraves is President of the Farkleville Chamber of Commerce. Farkleville is a sleepy North Arkansas town of 1500 citizens. It is near a proposed dam project area. Formerly a town of 3,000, since World War II the population has dwindled to 1500. The Chamber feels that the recreation potential of the small lake created by the dam will be an economic shot in the arm of Farkleville.

Mosquite Bend, a Southeast Arkansas town, underwent a similar project. The resulting tourism-related industries, have transformed the deteriorat-

ing town into a flourishing season tourist center. Mr. Hardgaraves feels that the resulting tourism will be more year-round than seasonal in Farkleberry, due to the dramatic seasonal changes in Northwest Arkansas.

PROFESSOR LEONARDO X. PRESSION

Professor Leonardo X. Pression, Chairman of the Art Department and Resident Poet at Northwest Arkansas University. He holds a Doctorate from a large Eastern University and is relatively new to Arkansas. He makes his home in Farkleville and enjoys a daily hour-long drive to Northwest Arkansas University. He settled in Farkleville because of the quiet, rustic setting and is quite upset at the prospects of a change in the hustle and bustle of a tourist trap.

Professor Pression points out that Farkeville is located in one of the poorest counties in the state. That the capital generated by the tourist lake would not benefit all the local people. "The rich get richer and the poor get poorer". The local people cannot take care of their own sewage and solid waste problems now, let alone those of an increased tourist population.

He stated that the ecology of the area simply cannot stand the increased usage of an additional projected 50,000 tourists a year.

JUST THE BEGINNING